

Intensity Frontier Computing

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Fermilab IF Program – an unofficial summary

Dates are approximate

Experiment	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Minos	Running	Running	Running	Running	Running	Running	Running	Running	Running	Running
NOVA	Development	Test/pre-running	Test/pre-running	Test/pre-running	Test/pre-running	Running	Running	Running	Running	Running
Minerva	Running	Running	Running	Running	Running	Running	Running	Running	Running	Running
Mu2E	Development	Development	Development	Development	Development	Development	Development	Running	Running	Running
LBNE	Development	Development	Development	Development	Development	Development	Development	Running	Running	Running
microboone	Development	Development	Development	Development	Running	Running	Running	Running	Running	Running
argoneut	Running	Running	Running	Running	Running	Running	Running	Running	Running	Running
miniboone	Running	Running	Running	Running	Running	Running	Running	Running	Running	Running
g-2	Development	Development	Development	Development	Development	?				

Development
Test/pre-running

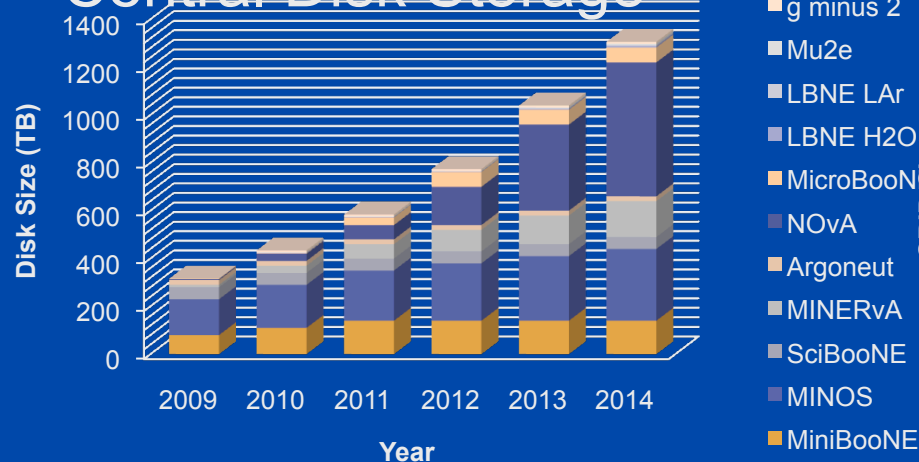


Running
Post-running

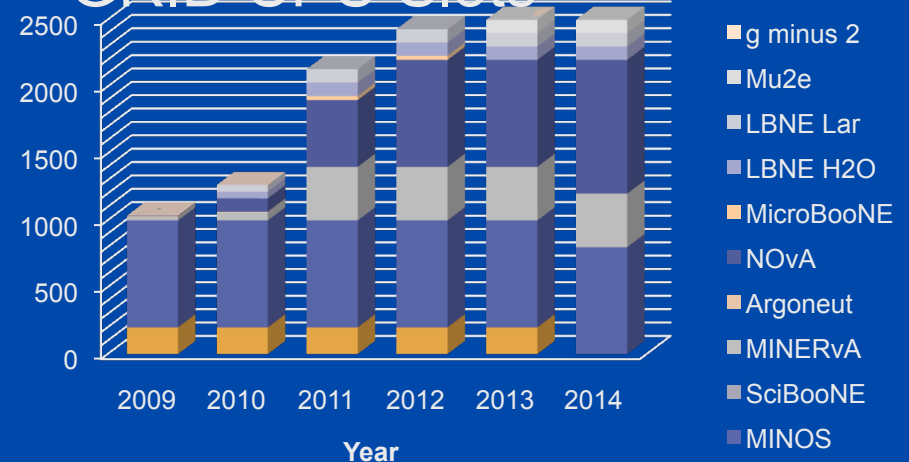


Intensity Frontier Computing Needs

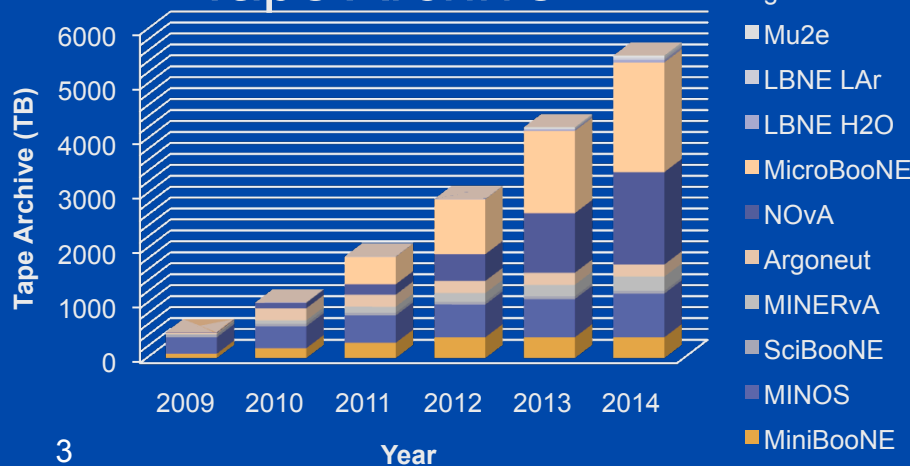
Central Disk Storage



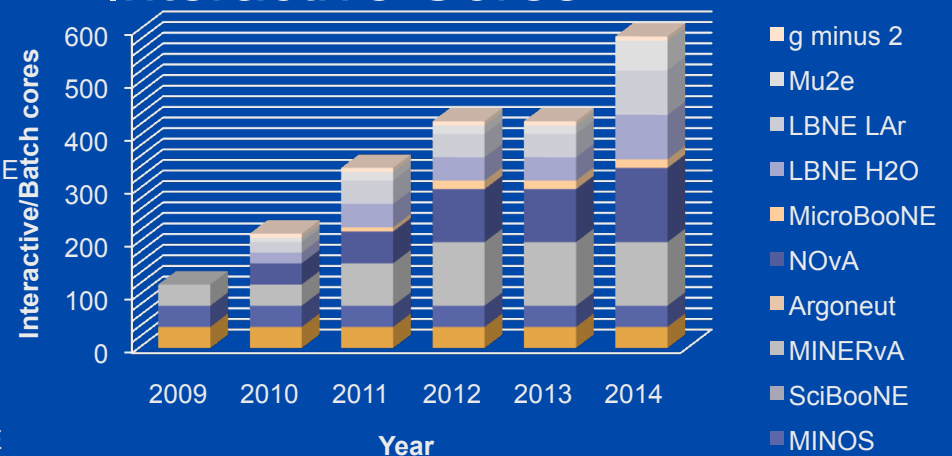
GRID CPU Slots



Tape Archive



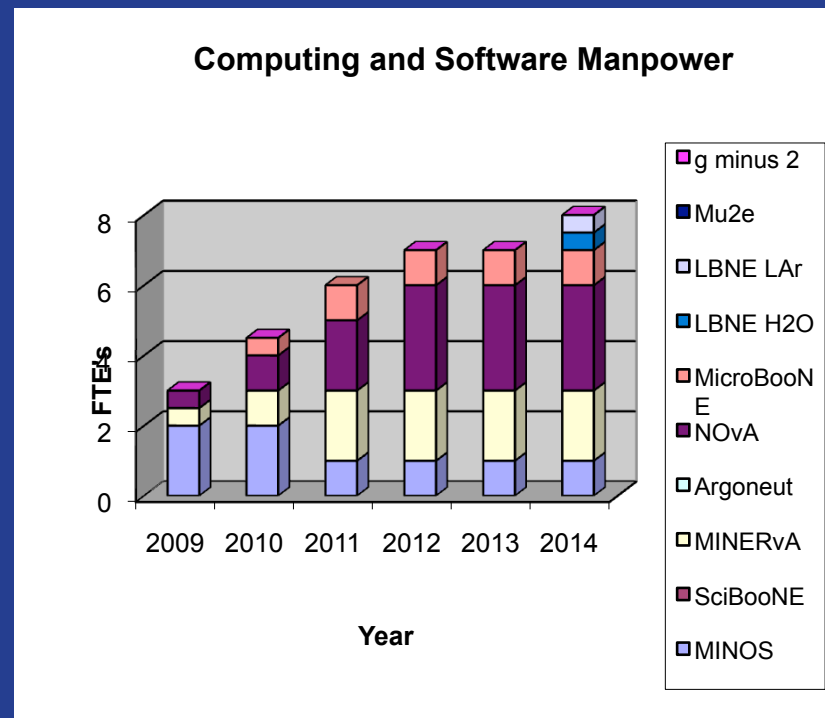
Interactive Cores



Intensity Frontier Software and Computing

– Personnel needs growing

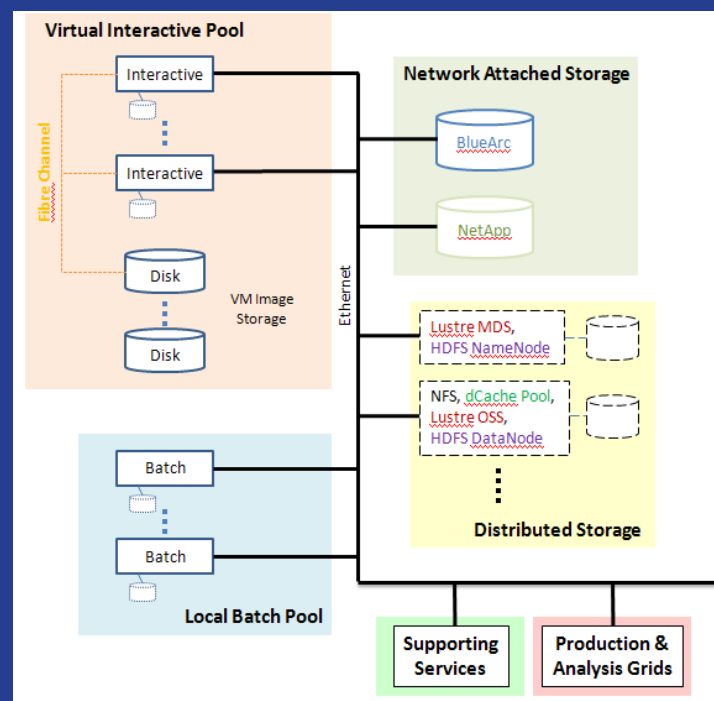
- Increased the number of CD scientists
 - Lee Lueking has been coordinating IF computing.
 - Rick Snider has been working on planning and MOUs.
 - Consulting from other CD scientists.
- CD hired 1 new associate scientist in FY10 (Andrew Norman - Nova)
- Several support staff moved from Run II to IF support. (requests in plot)
 - More will move in FY11
 - Helping with GRID computing, databases, virtual machines, data management.





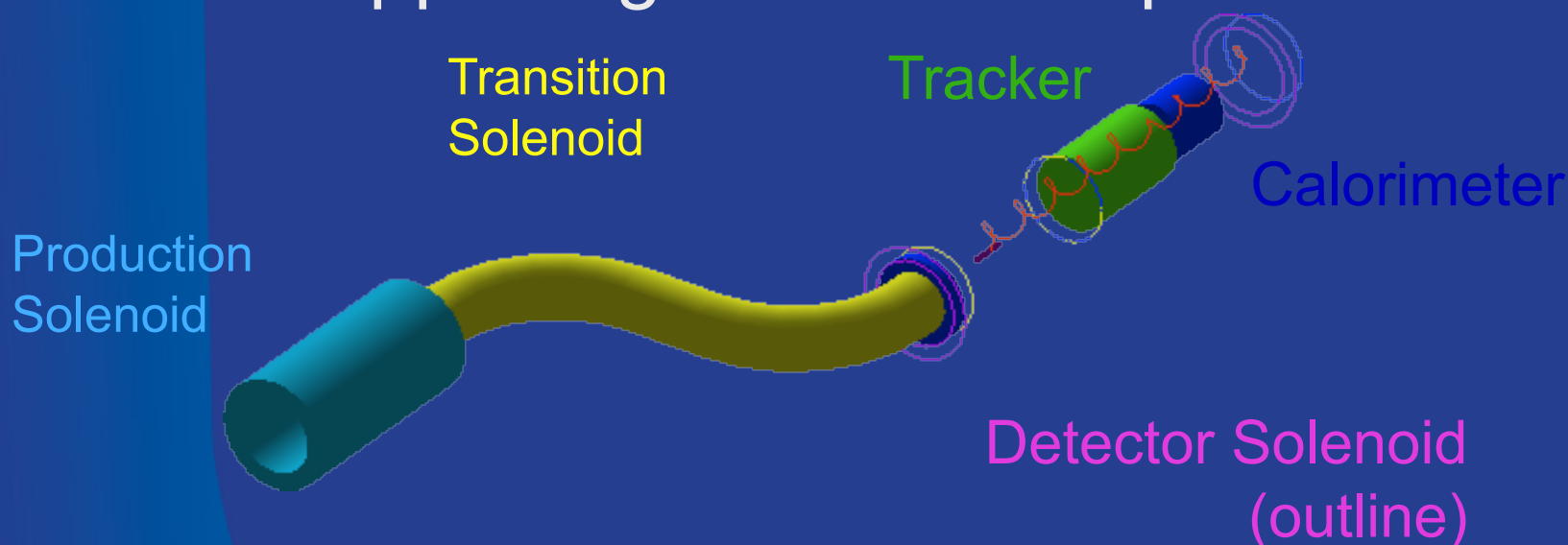
Support for Intensity Frontier Experiments analysis needs

- General Purpose Computing Facility (GPCF) – pool of virtual servers, allocated as needed
- Standardized hardware; stakeholders choose from a menu for new computing needs



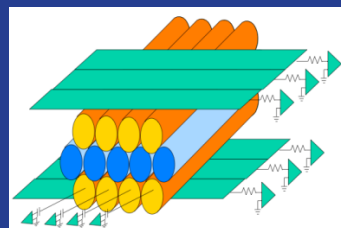
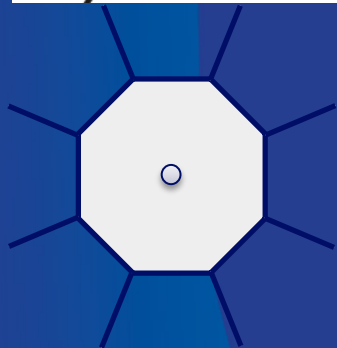
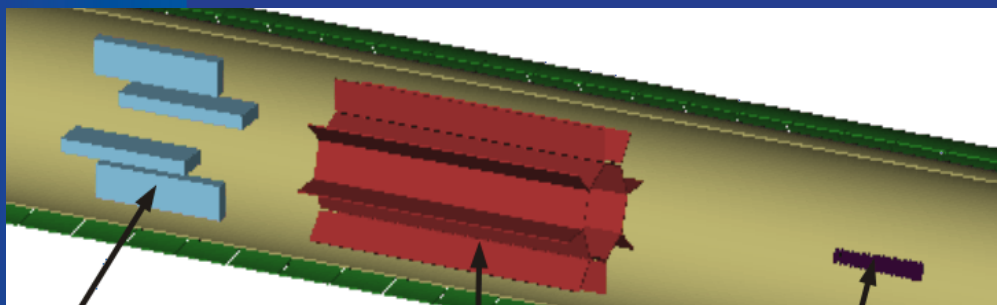


Supporting the Mu2e Experiment



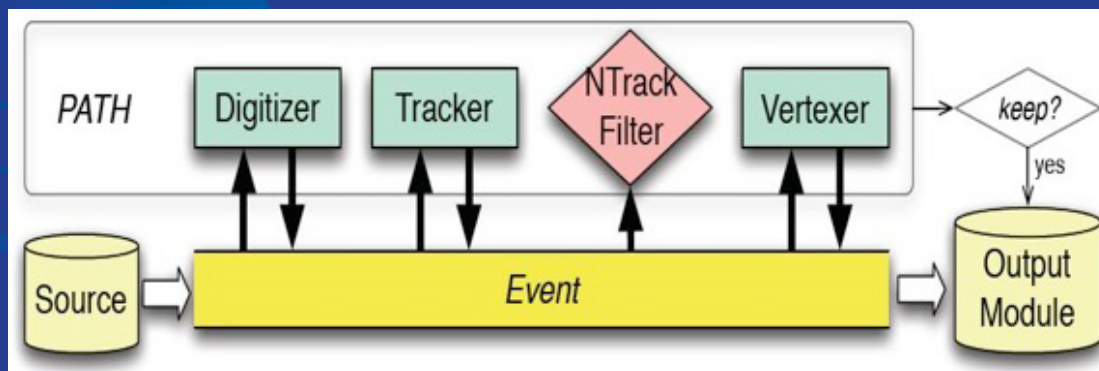
- Physics sensitivity studies (Rob Kutschke, Bob T., technical support)
- Pattern recognition algorithms for the Mu2e tracker
- Infrastructure Software supplied, developed and supported by CD.
 - Generic framework, EDM, Persistency, Runtime configuration
 - Build and release management.
 - Integration of Geant4 with the generic framework.

Offline Analysis Framework Development



Generic framework developed for intensity frontier experiments and projects (based on CMS framework)

- Adapted by Mu2e



Detectors (DAQ and Trigger Computing)

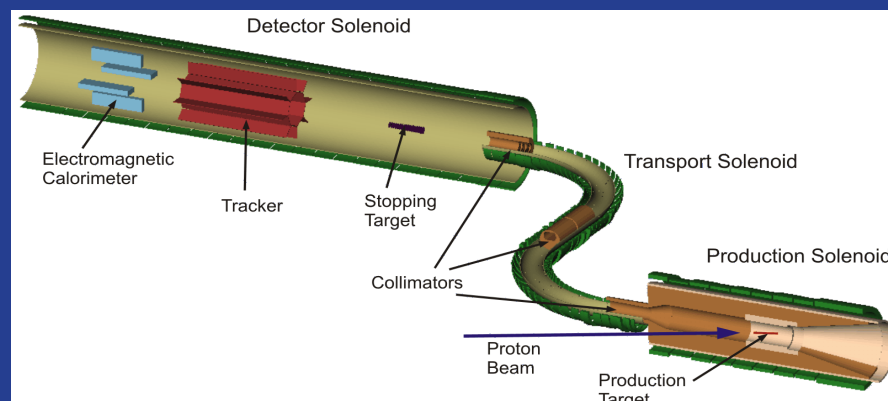
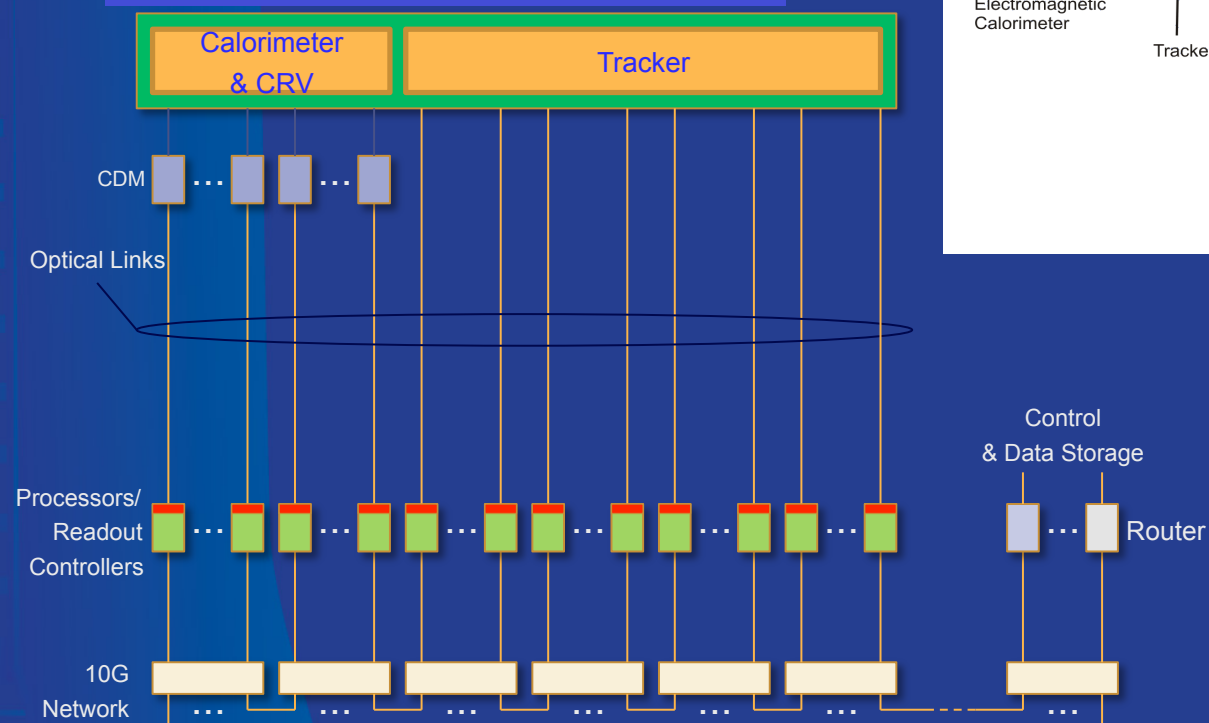
– some drivers of change

Energy Frontier	Intensity Frontier	Cosmic Frontier
CMS Upgrades - maintain progress in R&D => generic R&D	NOvA DAQ work ramping down to 0 in FY12	Low noise CCD readout may have applications in some of the prospective initiatives
	Mu2e DAQ can benefit from expertise	
	Can leverage DAQ expertise for other IF experiments (MicroBooNE?, LBNE?)	
Standard Engineering Process labwide requires tools and investment		
	DOE Projects (NoVA, mu2e, Project X, LBNE) require project support tools	

IF Computing Summary

- Intensity Frontier computing is expanding.
 - Many experiments...Budgets are tight...Number of available people limited.
 - Planning the needs for future IF program (R&D → operations)
 - Identified the need to expand scientific effort in CD.
 - Added an Associate Scientist position;
 - Need to expand support further in this area.
 - Working to meet the requests for disk/tape/cpu within budget limitations.
 - CD scientists are involved in DAQ, frameworks and simulations for upcoming IF experiments.
- We have monthly meetings with the spokespeople and the computing experts in the IF experiments.

DAQ and Trigger for Mu2e



Computing Division has started work on a conceptual design of the DAQ system for Mu2e with the following key features: streaming readout, event selection in software, commodity hardware
DAQ development experience from CDF, D0, BTeV, Nova

Simulation Science using High Performance Computing – some drivers of change

Energy Frontier	Intensity Frontier	Cosmic Frontier
Accelerator modeling needs to really ramp up for either ILC or Muon Collider	Accelerator modeling for Project X	Cosmological Computing initiative proposal for funding (else current cluster cannot be sustained)
Lattice QCD, Accelerator and Cosmology codes need to adapt to new hardware architectures		